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# Relative efficacy of school-home notes and classroom based contingencies in low-income elementary school students with Attention-Deficit/Hyperactivity Disorder

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RELATIVE EFFICACY OF SCHOOL-HOME NOTES AND CLASSROOM BASED  
CONTINGENCIES  
IN LOW-INCOME ELEMENTARY SCHOOL STUDENTS WITH  
ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

A Thesis

Submitted to the Graduated Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Master of Arts

in

The Department of Psychology

by  
Jennette Lea Palcic  
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## ABSTRACT

A great deal of evidence suggests that ADHD negatively impacts children's academic performance and on-task behavior. School-home notes have proven to be an effective and acceptable method of classroom behavior management. A school-home note is a daily report card in which a teacher rates a student on any number of target behaviors. The note is then sent home so that the child may receive consequences contingent on that day's behavior. Although successful at decreasing off-task behavior in the classroom, treatment integrity is not always maintained at acceptable levels. Additionally, ADHD children have been shown to be more responsive to immediate rather than delayed rewards which are inherent in home based rewards. This study compared the efficacy of classroom and home based rewards. Children were provided with a daily behavior report card and were evaluated on four target behaviors. Rewards were provided either at home or in the classroom contingent on appropriate behavior. Results indicated that both interventions improved on-task behavior as well as classwork completion and accuracy.

## INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is the most common psychological disorder in children (Rowland, Lessene, & Abramowitz, 2002). Prevalence estimates range from 2% -12%, depending on methods used for diagnosis (Kube, Petersen, & Palmer, 2002). Major symptoms of ADHD include developmentally inappropriate levels of inattention, hyperactivity, and impulsivity. Children with ADHD are at greater risk for developing problems such as academic underachievement, conduct problems, problematic peer relationships, low self-esteem, negative interactions with parents and teachers, and substance abuse (Frick & Lahey, 1991; Loeber, Green, Lahey, Frick, & McBurnett, 2000; Pelham & Hishaw, 1992). Problems associated with ADHD often persist into adolescence and adulthood (Pelham & Hinshaw, 1992). Consequently, early intervention is crucial.

The American Academy of Pediatrics (2001) recommends the treatment of ADHD in children should employ both stimulant medication and behavior therapy. Common types of stimulant medication include methylphenidate (Ritalin, Concerta, Metadate) and amphetamine (Adderall, Adderall XR). Approximately 80-90% of children respond favorably to stimulant medication (Pelham, Wheeler, & Chronis, 1998). Additionally, researchers have observed reductions in disruptive classroom behavior such as talking out, bothering peers, breaking rules, and behaving aggressively, as well as improvements in on-task behavior and academic performance in children treated with stimulant medication (Pelham & Hinshaw, 1992).

Research suggests that the combination of stimulant medication and behavior therapy is superior to the use of either stimulant medication alone or behavior therapy alone (Abramowitz, Eckstrand, O'Leary, & Dulcan, 1992; Carlson, Pelham, Milich, & Dixon, 1992). The MTA study (1999) examined the efficacy of medication management, behavior therapy, and the

combination of medication and behavior therapy in children 7 - 10 years old with ADHD.

Results suggested that medication management and the combination of medication management and behavior therapy were equally effective in treating the core symptoms of ADHD; although the combination of treatments was slightly more effective. Likewise, Carlson et al. (1992) showed that the use of behavioral classroom interventions in combination with methylphenidate (MPH) reduced the dosage of MPH necessary to achieve maximal behavioral improvements. Although stimulant medication effectively results in improved classroom behavior in ADHD children, medication has not been shown to improve the long term prognosis of ADHD, thus elucidating the importance of research concerning behavioral interventions for the treatment of ADHD (APA, 2001). Because ADHD children experience difficulties in the classroom, classroom based interventions are an essential component of treatment for ADHD. The following review will examine classroom contingency interventions including token economies, response cost, and home-school contingencies.

### Classroom Contingency Management

Behavioral classroom interventions such as contingency management have proven to be effective means of managing classroom behavior (Abramowitz & O'Leary, 1991; Pelham & Hinshaw, 1992). Research suggests that most teachers employ some type of behavior management system in the classroom; the most common being praise contingent on social or academic behavior (Rosen, Taylor, O'Leary, & Sanderson, 1990). However, praise alone may not adequately decrease levels of off-task and disruptive behavior in hyperactive children (Acker & O'Leary, 1987). Despite the implementation of behavioral strategies in many classrooms, ADHD children continue to exhibit high levels of inattention and hyperactivity in the classrooms (Fabiano & Pelham, 2003; NIH Consensus Statement, 1998).

Fabiano and Pelham (2003) speculate that the ineffectiveness in behavioral interventions commonly employed by teachers may be due to the teacher's inability to make adjustments to a behavioral intervention as needed, or due to a lack of intensity in feedback and consequences. Research has shown that ADHD children are more responsive to immediate rather than delayed rewards (Douglas & Parry 1994; Tripp & Alsop, 2001). ADHD children compared to non-ADHD children express a much stronger preference for smaller more immediate rewards than larger delayed rewards (Tripp & Alsop, 2001). Sonuga-Barke, Taylor, Sembi, and Smith (1992) found that ADHD children were more willing to work to increase rewards and to decrease length of delay to the next reward. In a recent study of the effects of delayed rewards and tokens on sportsman-like behavior in ADHD children, Hupp, Reitman, Northup, O'Callaghan, and LeBlanc (2002) found that delayed rewards had little effect on sportsman-like behavior; however, the addition of tokens with the delayed reward increased good sportsmanship. The tokens are believed to function as an intermediate step linking the appropriate behavior to delayed reinforcement (Barkley, 1996, August). Tokens with delayed rewards also have been used successfully in the classroom to provide reward immediacy for ADHD children (DuPaul & Stoner, 1994).

Token economies involve awarding children with tokens, points, or chips for appropriate behavior. These tokens are later exchanged for objects such as candy, prizes, or privileges such as extra recess or computer time (Abramowitz & O'Leary, 1991; Barkley, 2000). Research shows that the use of preferred academic tasks can serve as effective reinforcement and reduce the need to introduce arbitrary prizes irrelevant to the curriculum (Noell, Whitmarsh, VanDerHeyden, Gatti, Slider, 2003). Token economies have been effectively used in hospital, school, and home settings and come in many variations including both individual and group



contingencies (Drabman, Spitalink, & Spitalink, 1974). Drabman et al. (1974) compared the use of individual reinforcement based on individual performance to group reinforcement based on the performance of either the most disruptive, least disruptive, or a randomly selected child. All four conditions equally reduced inappropriate behavior in the classroom. Teachers preferred group reinforcement determined by a randomly selected child, citing that it required the least amount of time from the teacher.

Several studies have shown the value of token economies to motivate children to decrease disruptive behavior (Anhalt, McNeil, & Bahl, 1998; Higgins, Williams, & McLaughlin, 2001; Robertson, DeReus, & Drabman, 1976). For example, Higgins, Williams, and McLaughlin (2001) investigated the use of token reinforcement for decreasing inappropriate behaviors in a third grade male with learning disabilities. The child received a check every minute the target behaviors did not occur. The checks earned preferred tasks such as computer time, math worksheets, leisure reading, and academic games and were shown to effectively reduce the rate of the target behaviors.

Token economies have also been used to improve academic performance (Robinson, Newby, & Ganzell, 1981). In a third grade classroom of hyperactive males, students earned tokens for successful completion of reading and vocabulary tasks and serving as a proctor to another student. Tokens were traded in for 15 minutes of video games. Results demonstrated that token economies resulted in increased work completion and academic performance.

The aforementioned studies indicate that token reinforcement can be used to increase appropriate classroom behavior. However, research consistently has shown that positive consequences alone generally are not sufficient to obtain and maintain optimal behavior change in ADHD children (Acker & O'Leary, 1987; Forehand, 1987; Pfiffner & O'Leary, 1987; Rosen,

O’Leary, Joyce, Conway, & Pfiffner, 1984). Rosen et al. (1984) examined the use of positive and negative consequences on the maintenance of on-task behavior of eight ADHD boys in the classroom. Positive consequences were given in the form of hugs, smiles, and verbal praise, while negative consequences involved reprimands or loss of recess time. Results indicated that the combination of positive and negative consequences increased on-task behavior and the use of negative consequences alone maintained these levels of on-task behavior. However, the use of positive reinforcement alone resulted in a sharp decline in on-task behavior.

Acker and O’Leary (1987) hypothesized that the results of the previous study by Rosen, O’Leary, Joyce, Conway, and Pfiffner (1984) could be attributed to the fact that the onset of the study occurred well after the beginning of the school year. The investigators believed that the effects of positive reinforcement could have become less salient and peer relationships were more developed causing more of a distraction in the classroom. Acker and O’Leary (1987) examined the use of praise and reprimands at the beginning of the year on levels of on-task behavior in nine elementary school children referred for behavioral difficulties. The researchers began by requiring the teacher to use reprimands and no praise and then introduced praise at a later point. Again, the use of reprimands alone was associated with the highest levels of on-task behavior and the addition of praise did not significantly increase on-task behavior. However, the use of positive reinforcement alone after an absence of both positive and negative consequences resulted in a slight, consistent, initial increase in on-task behavior, but did not maintain. The results of this study are commensurate with Rosen et al. (1984) highlighting the necessity of reprimands to increase on-task behavior to optimal levels in ADHD children.

Pfiffner and O’Leary (1987) investigated the use of all positives consequences without the prior history of negative consequences. Experimenters observed the on-task behavior of

eight, first through third graders with academic/behavioral problems. During the initial three days of praise for appropriate behavior, on-task behavior for all eight children dropped from a mean of 77% to 41%. The addition of negative consequences resulted in an immediate increase in on-task behavior to a mean of 80%. The immediate withdrawal of reprimands resulted in a drop in on-task levels of most children. However, when negative consequences were decreased gradually, levels of on-task behavior were maintained. Authors speculated that given more time in the study, negative consequences could have been eliminated all together. This study underscores the importance of negative consequences such as reprimands in the management of child behavior.

Additionally, the type of negative consequence appears to be of critical importance to classroom behavior. Rosen, O'Leary, Joyce, Conway, and Pfiffner (1984) evaluated the use of prudent versus imprudent reprimands and subsequent effects on classroom behavior. Prudent reprimands were defined as calm, immediate, consistent, quiet, appropriate, and specific; while imprudent reprimands consisted of inconsistent, loud, emotional, public, verbal reprimands. Imprudent reprimands resulted in a deterioration of classroom behavior. Noise levels rose, and students began to run around and bother others. The reinstatement of prudent reprimands immediately reduced levels of disruptive classroom behavior. Furthermore, Van Houten, Nau, MacKenzie-Keating, Sameoto, and Colavecchia (1982) add that maintaining eye contact, standing in close proximity, and grasping the student's shoulders increased the effectiveness of reprimands.

Similarly, immediacy of is also paramount to the effectiveness of negative consequences. Abramowitz, Eckstrand, O'Leary, and Dulcan (1992) investigated the use of a stimulant medication and a behavioral intervention (consisting of immediate and delayed reprimands) on

the on-task behavior of three, 10 to 11-year-old children with ADHD. Results indicated that immediate reprimands increased on-task behavior to equal levels as those achieved with medication.

As demonstrated above, reprimands have proven to be a quick and effective manner of increasing and maintaining on-task and appropriate classroom behavior in school aged children. Recently, token economies have been modified to incorporate the use of negative consequences known as a response cost procedure. A response cost procedure involves the loss of privileges, tokens, or points for misbehavior or failure to meet criteria for reward. The implementation of response cost has improved the effectiveness of traditional token economies (Kerr & Nelson, 1983; McGoey & DuPaul, 2000; McLaughlin & Williams, 1988).

For example, Witt and Elliott (1982) demonstrated the impact of response cost and group contingencies on the on-task behavior of three male fourth graders with behavior problems. Students were allotted four slips of paper which were taken away for violations of classroom rules. At the end of class, students placed their remaining slips in a box for the lottery at the end of each week. During the lottery a slip of paper was chosen from the box with a student's name on it. That student was then allowed to choose a reward. The lottery proved to be an effective method to increase on-task behavior, while requiring minimal effort from the teacher.

McGoey and DuPaul (2000) compared the effectiveness of response cost and token reinforcement procedures in four preschool children with ADHD. In the token reinforcement phase, students earned buttons on a chart for the presence of appropriate behavior. In the response cost phase, students began the day with a full allotment of buttons, and buttons were removed contingent upon inappropriate behavior. At the end of the day students turned in their buttons for a larger reward if the specific criteria were met. Both interventions were found to

significantly reduce disruptive behavior; however, teachers preferred the response cost intervention. The authors cite the high student-teacher ratio as a possible reason for this preference. With so many students to one teacher, it is difficult for the teacher to catch the child being good. Teachers considered the response cost procedure to be a fair and consistent means of managing classroom behavior.

Response cost, like reprimands, has been associated with better maintenance of classroom behavior. In a comparison of rewards and response cost, both were found to equally improve classroom behavior; however, response cost was found to maintain higher rates of on-task behavior during fading than rewards alone for hyperactive children (Sullivan & O’Leary, 1990).

Additionally, response cost procedures have been shown to improve academic accuracy. In contrast to rewards, Carlson, Mann, and Alexander (2000) found response cost improved accuracy on an arithmetic task and normalized intrinsic motivation of 40 ADHD children. However, self-rated motivation was lower for the response cost procedure. Carlson and Tam (2000) continued this line of research into the effect of response cost on motivation by including the use of high and low interest tasks. Again response cost was more effective than rewards alone, but self-rated motivation was lower in the response cost condition for low interest tasks.

Several multi-component classroom interventions have evolved from the research on contingency management in the classroom (Anhalt, McNeil, & Bahl, 1998; Filcheck, McNeil, Greco, Bernard, 2004; Kehle, Bray, & Theodore, 2000). For example, the ADHD Classroom Kit was designed as a whole classroom reinforcement system with group consequences for both appropriate and inappropriate behavior (Anhalt, McNeil, & Bahl, 1998). The positive component consisted of labeled praise, happy faces, and a rewards target game (provided short

breaks from academic tasks), while the negative component was comprised of a sad-face warning signal, sad faces, and losing privileges to play the rewards target game. The effectiveness of the Kit was examined by a preliminary case study of a 6-year-old girl with disruptive behavior problems. The Kit effectively increased on-task behavior to normal levels. Removal of the Kit resulted in a subsequent decrease in on-task behavior, indicating a functional relationship in the use of the Kit and on-task behavior.

### Home Based Contingencies for Classroom Management

Home based contingency programs include daily feedback from the teacher to the child and parent about the child's daily behavior (DuPaul & Stoner, 1994). Daily reports cards, also known as school-home notes, are a common implementation of a home based reinforcement system. School-home notes consist of a list of target behaviors for which the child's performance is rated. As in a token economy, children earn points for positive ratings. The note is sent home and reviewed with the parent. Appropriate consequences are delivered based on predetermined criteria (Abramowitz & O'Leary, 1991). Effective consequences implicated in the literature include, snacks, TV time, late bedtime, verbal praise, freedom from chores (Heaton Safer, Allen, Spinnato, & Pruno, 1976; Schumaker, Hovel, & Sherman, 1977; Taylor, Cornwell, & Riley, 1984). Kelley (1990) suggests that both classroom and academic behaviors should be targeted. Furthermore, the teacher should evaluate the note with the child at specified times throughout the day, in order to provide the child frequent and consistent feedback.

School-home notes and home based consequences have proven to be an effective means of managing classroom behavior (Lahey, Gendrich, Gendrich, Schnelle, Gant, & McNees, 1977; Dougherty & Dougherty, 1977; Allyon, Garber, & Pisor, 1975). For example, Allyon, Garber, & Pisor (1975) sent home a "Good Behavior" letter contingent on the absence of behaviors such as

being out of seat, talking out of turn, and disruptive motor activity. Appropriate contingencies were delivered by the parents depending upon receipt or non receipt of the letter. Disruptive classroom behavior was reduced from 90% to 0% with the implementation of both the behavior note and home based contingencies.

Additionally, school-home notes have been shown to enhance academic performance (Blechman, Kotanchik, & Taylor, 1981; Blechman, Taylor, & Schrader, 1981, Dougherty & Dougherty, 1977). For example, Dougherty and Dougherty (1977) targeted behavior problems and homework completion. The percentage of children not completing their homework dropped from 34.7% to less than 17%. Schumaker, Hovell, and Sherman (1977) demonstrated the effectiveness of a daily school-home note at improving the academic performance of students who are many years behind their grade level.

Commensurate with previous research in the effectiveness of negative consequences, response cost components have been demonstrated to enhance the effectiveness of school-home notes (Kelley & McCain, 1995; McCain & Kelley, 1994). McCain and Kelley (1994) compared the use of a school-home note with and without a response cost component on the classroom behavior of three, low SES, 11-year-old boys with ADHD. Levels of on-task, off-task and disruptive behavior were measured. Students received ratings of either “yes” “so-so” or “no” for two target behaviors: completed classwork satisfactorily and used classtime well. During the response cost phase of the study, a row of five smiley faces appeared on the note in addition to the target behaviors. Each time a reprimand was delivered, the teacher calmly stated the rule that was broken and instructed the child to cross off a smiley face. Rewards were delivered at home contingent upon minimal loss of points. Using a multiple baseline with alternating treatment

design, response cost was shown to significantly improve the effectiveness of the school-home note in reducing off-task and disruptive behavior of all three children.

Kelley and McCain (1995) evaluated the effectiveness of response cost in improving the academic performance of five inattentive elementary school children. The two notes in the study were identical to the notes described above. Children received rewards at home contingent on the number of points remaining on the note. On-task and off-task behavior were measured. Academic performance was assessed for completeness and accuracy. Using an alternating treatment reversal design, the school-home notes with and without response cost were compared. The results indicated that both notes effectively increased appropriate behavior and academic performance of all children in the study. However, the response cost component was shown to be more effective than the school-home note without response cost for three of the five children.

More recently, Jurbergs (2002) replicated the previous study with six, African-American first and second graders with ADHD. The school-home note was found to increase appropriate classroom behavior and academic productivity. However, no consistent added benefits were found with the use of the response cost component. Specifically, for two children the response cost note was more effective and for one child the note without response cost was more effective. For the remaining three children, no differences in levels of on-task behavior between the two notes were found. Treatment acceptability also was examined using vignettes describing treatments and having teachers, parents, and students rate each one on the TEI- short form. Both notes were rated as highly acceptable by teachers, parents, and students; however, the response cost note was rated as more acceptable.

Similarly, Pisecco, Huzinec, & Curtis (2001) compared the treatment acceptability of a daily report card, response cost technique, a classroom lottery, and medication. Teachers read



one of six vignettes describing the treatment and rated the treatment on the Behavioral Interventions Rating Scale (BIRS). Results revealed that teachers found the daily behavior report card to be more acceptable, effective, and quicker to produce a change in behavior. Interestingly, medication was viewed as being equally as fast acting, but was not viewed as an acceptable form of intervention. Power, Hess, and Bennett (1995) also determined that the daily report card was more acceptable than a response cost intervention and medication, but added that only when a pharmacological and behavioral interventions are used in tandem do teachers view medication as an acceptable intervention for ADHD children.

In conclusion, previous studies tout the efficacy of school-home notes and home based contingencies in increasing appropriate classroom behavior and academic performance (Allyon, Garber, & Pisor, 1975; Blechman, Kotanchik, & Taylor, 1981; Jurbergs, 2000; Kelley & McCain, 1995; McCain & Kelley, 1994; Rosen, Taylor, O'Leary, & Sanderson, 1990; Schumaker, Hovel, & Sherman, 1977). Abramowitz & O'Leary (1991) mention many advantages of the use of home based contingencies. Home based contingencies require minimal effort, cost, and change in routine for the teacher. Additionally, they alleviate concerns over the special treatment of the target child. Perhaps the most widely recognized advantage of home-school contingencies is in the formation of a structured and consistent form of daily communication between the teacher, child, and parent. Some criticisms of the school-home note are that there is a significant delay between the appropriate behavior and the reinforcement. Additionally, the school-home note is subject to problems caused by lack of treatment integrity. Given the many benefits of the use of home contingencies over classroom contingencies alone, school-home notes represent an important line of research in the treatment of ADHD, disruptive classroom behavior, and academic underachievement.

## STUDY RATIONALE

Both classroom based contingency systems and school-home notes are effective in decreasing disruptive behavior and increasing attention and academic productivity in ADHD children. There are many benefits to the use of the school-home note, such as increasing communication between the parent and teacher and producing changes in behavior with minimal effort from the teacher. However, treatment integrity in the home cannot be ensured. Anecdotally poor treatment integrity in the home is believed to hinder the effectiveness of the school-home note. Additionally, the delay in reinforcement inherent in home based rewards may also weaken the effectiveness of the school-home note. To avoid problems associated with home based rewards, rewards could be provided in the classroom more consistently and immediately. The purpose of this study was to compare the efficacy of home based and school based rewards in elementary students with ADHD.

## HYPOTHESES

1. Both school-home note and classroom rewards interventions will increase on-task behavior. Both will be more effective than the control condition.
2. Both interventions will increase work completion and accuracy of classwork.
3. The classroom rewards will be more effective than the school-home note at increasing on-task behavior and academic productivity.
4. Both interventions will decrease the parent and teacher ADHD Rating Scale Total Symptom Scores from pretreatment administration to posttreatment administration. Parent and teacher ratings of students in the control group will remain stable.
5. The school-home note will be viewed by the teachers as a more satisfactory intervention than the classroom rewards.

## METHOD

### Participants

Forty-three, first through third graders attending East Baton Rouge Parish Public Schools were selected. Students were included in the study using the following criteria: 1) significant levels of off-task/disruptive behavior in the classroom as indicated by the teacher 2) a diagnosis of ADHD (evaluation will consist of parent interview, teacher interview, behavioral observation, and parent and teacher rating scales, and 3) average academic abilities (as measured by the Woodcock Johnson III Tests of Achievement). Participants were referred by their teachers to participate in the study. Teachers sent home 120 flyers with the researcher's contact information and a brief description of the nature of the study to the parents of the referred children. Of those 120 referred students, a total of 81 parents contacted the investigator to enroll their child in the study. Woodcock-Johnson III subtests and rating scales were administered to all 81 students. Twenty-two of those children did not meet criteria and were therefore excluded from the study. Of the remaining 59 students, 14 were randomly assigned to a treatment group for a related study, and 45 participated in the present study. Only 2 participants did not remain in the study for its entirety. The 2 students were excluded mid-study due to lack of treatment integrity by the teacher.

### Demographics

Demographic information was gathered about the parents, students, and teachers using questionnaires. This data provided descriptive information about the parent and child such as race, gender, SES, parent's education level, and marital status. The teachers were asked for information such as race, gender, education level, and teaching experience.

## Diagnosis

The ADHD evaluation consisted of parent and teacher interviews, behavioral observation, and the following questionnaires completed by the parents and teachers: Conners' Parent Rating Scale- Short Form (CPRS-R:S), Conners' Teacher Rating Scale- Short Form (CTRS-R:S) (Conners, 1997), ADHD Rating Scale for DSM-IV (DuPaul, Power, Anastopolous, & Reid, 1998). These questionnaires are standardized assessment measures of child behavior problems. The Conners' technical manuals provide cut-off scores for each of the diagnostic tools that indicate when a child's problems are clinically significant (Conners, 1997). The ADHD Rating Scale provides scores which correspond to percentile rankings (DuPaul et al., 1998). Scores above the 98<sup>th</sup> percentile are considered clinically significant. Also, the child's classroom behavior was observed for levels of off-task behavior. Children displayed on-task behavior for less than 60% of the observation period.

## Academic Abilities

In order to ensure that the students in the study had the skill levels necessary to complete the assigned classwork, a brief measure of academic skills was conducted. The academic abilities of the students were assessed using the Letter-Word Identification, Calculation, and Spelling subtests of the Woodcock Johnson Tests of Achievement-III (WJ-III; Woodcock, McGrew, & Mather, 2001). The WJ-III is an individually administered test of achievement. Students' standard scores are created by comparing their performance on the subtests to other students his or her age in the standardization sample. The manual provides ranges of scores with corresponding levels of achievement. Children with a standard score one standard deviation below the mean or lower based on grade level were excluded from the study.

## Setting

The intervention was implemented in the classroom of each individual student. All classrooms were regular education classrooms in one of four inner-city public schools. Each classroom had one teacher and between 26 and 30 students. The students and teachers were observed in the classroom during the morning work period. Observations were conducted during individual seatwork activities.

## Design and Procedures

A between groups design with three treatment groups was used to compare the effects of no treatment (control), classroom rewards, and a school-home note for increasing children's on-task behavior and classwork completion. Teachers referred students who displayed average academic abilities and significant levels of off-task/disruptive behaviors. Students were randomly assigned to one of three groups with the constraint that the groups be balanced in terms of gender, and percentage of off-task behavior.

Intake Interview/Assessment Procedure. Prior to data collection, the parents were interviewed and informed of the purpose of the study. They were told the study compares the effectiveness of two classroom interventions versus no treatment. Informed consent was obtained (see Appendix). After agreeing to participate, parents were asked to complete a demographics questionnaire, the ADHD Rating Scale-IV, and the Conners' Parent Rating Scale-Short Form (CPRS:R-S); and teachers completed a demographics questionnaire, the ADHD Rating Scale-IV, and the Conners' Teacher Rating Scale-Short Form (CTRS:R-S). To assess academic abilities, either one of the trained observers or the researchers administered subtests from the reading, math, and spelling portions of the WJ-III. Additionally, a classroom observation was performed by the researcher to determine pretreatment levels of on-task

behavior. After meeting inclusion criteria, students were randomly assigned to one of three groups. Numbers one through three were arbitrarily assigned to each group. A computer program was used to repeat these numbers in a random order. As participants were included in the study they were assigned to groups using this table of random numbers. The groups were balanced in terms of gender and percentage of off-task behavior. Once participants were assigned to groups the study ran approximately five weeks.

Control Group. In addition to three pre-treatment observations conducted during the intake/assessment phase of the study, the participants in the control group were observed for 30 minutes in their classrooms three times at the end of first 2 weeks of the treatment, and three times at the end of the last two weeks of the study. Observations were conducted in the mornings during independent seatwork. On the days that the child was observed, the observer collected their classwork from the morning and made photocopies. These copies were graded for percentage complete and percentage correct.

School-home Note Group. The participants in the school-home note group were similarly observed and their work was also collected and graded. Each day during the 4 weeks of treatment, each participant retrieved a “school-home note” from a designated folder in the classroom and placed it on his or her desk. The note contained four target behaviors. The child’s teacher evaluated and rated the student on each of those behaviors by circling either a “Yes,” “So-So,” or “No.” A rating of “Yes” indicated that the student behaved within the normal range, “So-So” indicated that the student behaved marginally appropriate, and “No” indicated unsatisfactory behavior. Also, the note contained a response cost of five “smiley faces.” The teacher instructed the students to cross off one of their smiley faces whenever they were off-task or behaving disruptively. The teachers were instructed to be specific, calmly state

the reprimand, and ensure the child crossed off the smiley face. Prior to beginning the school-home note intervention, the parents and students assigned to this group were instructed in the use of home based reinforcement and handouts explaining school-home notes were provided. Parents and students were shown a school-home note and it was explained that the note would be completed by the teacher each day and sent home with the child. A rating of “Yes” was worth 2 points, “So-So” was worth 1 point, and “No” was worth 0 points. Also each remaining smiley face was worth 1 point. The maximum points available on the note was 13 points (4 ratings of “Yes” worth 2 points each and all 5 smiley faces remaining). The researcher assisted the parent and student in constructing a contract that outlined the contingencies for what constituted a “good note.” For example, a student’s contract might have specify that 9 points (2 ratings of “Yes,” 2 ratings of “So-So,” and 3 remaining smiley faces) were required to receive reinforcement. The teacher verbally reviewed the note with the child before lunchtime, and the child brought the note home daily. The parent reviewed the child’s performance with him or her, determined if it met criteria for a “good note,” and provided the proper consequences. The parent indicated the reward earned (if any), signed the note, and returned it to school with the child. The next day, the child replaced the previous day’s note and obtained a new note for the current day.

Classroom Based Rewards Group. The participants in the classroom based rewards group, also were observed and had work collected in an identical manner to the other two groups. The students in the classroom based rewards group placed a “classroom note” analogous to the school-home note on his or her desk. In the same manner as the school-home note group, teacher ratings on the classroom note were circled and the response cost component was utilized when the child displayed off task or disruptive behavior. Prior to beginning the classroom note



intervention, the teacher and students assigned to this group were instructed in the use of the classroom note. It was explained that the note was to be completed by the teacher each day. The researcher assisted the teacher and student in constructing a contract outlining the contingencies for what constituted a “good note.” The researcher and the teacher developed a list of rewards the child could earn. Rewards consisted of the opportunity to engage in a preferred activity and choose a prize from a mystery box. The teacher verbally reviewed the note with the child before lunchtime, determined if it met criteria for a “good note,” and provided the appropriate consequences. Upon receiving a good note the child was allowed to select one reward from the list. The note was then placed back in the folder.

### Dependent Measures

Observational Coding System. Student behaviors were coded using 15-second time samples. The coding system was a modification of a method used by Pfiffner and O’Leary (1987) and the State-Event Classroom observation system revised by Saudargas & Fellers (1986). The dependent measure was the percentage of intervals in which the student was engaged in on-task behavior. On-task behavior was defined as a full 15-second interval in which the student is engaged in appropriate, assignment-related activities. An interval was coded as off-task if the student was not engaged in the assignment for 3 consecutive seconds of the interval. As previously mentioned, observations were conducted in the morning during independent seatwork.

Observers were undergraduates blind to the purpose of the study. Each observer received didactic instruction in the use the coding system. Instruction included discussion, modeling of examples of possible classroom behavior, and practice sessions in several elementary classrooms in which randomly selected students were observed and coded by two or more trainees at a time.

Observers were required to obtain inter-rater reliability above 80% during the practice sessions before beginning to code the study participants. The average agreement between raters during training was 93.86% with a range of 86.90% - 100%.

Reliability. Reliability data were gathered on 20% of the sessions. Those sessions were coded by two observers and their ratings were compared for agreement in ratings. Observers achieved an average agreement of 94.80% during the study with a range of 86.90%-100%.

Completed Academic Assignments. The percent of classwork attempted as well as the percent of work completed correctly was evaluated. The researcher obtained the child's classwork from each morning he/she was observed and made copies. The copies were then graded. The two dependent measures were the mean percent of problems completed daily and the mean percent of problems correct. Both the researcher and teacher graded the assignments independently to ensure reliability. Both the teacher and researcher were in agreement 100% of the time.

Treatment Integrity. To ensure that the school based portion of the intervention was properly implemented, a treatment integrity checklist was used in the classroom based rewards and school-home note groups. The treatment integrity checklist was completed by observers during 20% (4 sessions) of the feedback sessions with each student in each of the treatment groups. Each of the seven items was checked if the item was completed according to protocol. Items not completed according to protocol were left blank. The number of checks earned was divided by the total number of possible checks to determine the percentage of treatment integrity. The percentage of treatment integrity of the four sessions was averaged yielding an overall average percentage of treatment integrity. Students with an overall average less than 80% were excluded from the study. This resulted in 2 students, one from each treatment group being

excluded from the study. The mean level of overall treatment integrity for the School-Home Note and Classroom Note groups was 97% and 98% respectively.

To ensure the proper implementation of the home based portion of the intervention for the school-home note group, parents were required to report the reward provided each day, sign the note, and return it to school with the child. At school, the child placed the previous day's note in the folder and obtained a new note for the day. Notes were inspected daily by the researchers and undergraduate research assistants for proper implementation and parents were called if a note was missing. If fewer than 80% of the notes were returned to school for any one subject, then that subject was excluded from the study. All of the students returned at least 80% of the School-Home Notes, and thus none were excluded for this reason. The mean level of parent treatment integrity for the School-Home Note group was 83%.

Treatment Satisfaction. To measure treatment satisfaction, interviews were conducted at the end of the study with the teachers. Questions were adapted from the Treatment Evaluation Inventory - Short Form (TEI-SF), which is a valid and reliable measure of treatment acceptability (Miller & Kelley, 1994). The parents of the School-Home Note group were contacted at the end of the study. Parents were given the opportunity to comment freely on the treatment.

The teachers were interviewed using a series of eight questions rated on a five-point Likert scale. Scores were coded in an identical manner to the parent questionnaire. The teachers who had multiple treatments in their classrooms were asked to comment on which they found more acceptable. The percentage of teacher acceptability was calculated in the same manner as for the parent acceptability measure. Possible scores could range from eight to forty, a higher score indicated a more acceptable treatment.

## RESULTS

### Participant Variables

Participant variables were examined to provide information about the sample characteristics of the 43 students. Table 1 provides a summary of the participant demographics. All participants were African-American, 65% were male, and 35% were female. The sample contained 65% first graders, 19% second graders, and 16% third graders. The mean age of the sample was 7-years-old. Parents and Teachers rated each child on the ADHD Rating Scale. The mean total symptom score for the parent completed ADHD rating Scale was 31 out of 54 while the mean total symptom score for teacher completed ADHD Rating scale was 41 out of 54. All students were administered the Academic Skills subtests of the Woodcock Johnson-III. The average Standard Score for the sample was 105 which is in the average range. Data taken during the first three observations were averaged together to describe the target behaviors of the sample pretreatment. The entire sample was on-task an average of 38%, completed an average of 74% of their work, and received an average accuracy rating of 55%. Twenty-one percent reported taking some form of medication for attention problems, while 79% denied taking any type of medication for attention problems. Information about the mothers of the participants was also collected for each subject. Twenty-one percent of the participants mothers reported being married, while 79% reported being single. The mean years of education completed by the mothers of the participants was 11 years. In terms of reported annual income level, 54% of the sample reported earning under \$3,000, 32% reported earning between \$3,000 and \$14,000, 9% earned between \$15,000 and \$29,000, and 4.7% reported earning \$30,000 and over.

### Preliminary Analyses

For the following analyses HOV or sphericity are assumed unless otherwise noted. To ensure that the groups were not significantly different from one another between subjects one-way ANOVAs were conducted and showed that the groups were not significantly different in terms of grade level,  $F(2, 40) = 1.35$ , ns; age,  $F(2, 40) = .01$ , ns; gender,  $F(2, 40) = .51$ , ns; annual household income level,  $F(2, 40) = 1.07$ , ns; medication status,  $F(2, 40) = .37$ , ns; mother's education level,  $F(2, 40) = .10$ , ns; mother's marital status,  $F(2, 40) = .33$ , ns; academic skill level,  $F(2, 40) = .25$ , ns, pretreatment parent ADHD Rating Scale Total Symptom Score,  $F(2, 39) = 1.35$ , ns, and pretreatment teacher ADHD Rating Scale Score,  $F(2, 39) = .30$ ,  $p < .05$  (See Table 2).

### Teacher Demographics

As can be seen in Table 1, a total of 19 teachers participated in the study, all of whom were females. Of the 19 teachers 63.2% were African-American and 36.8% were Caucasian. The average age of the teachers was 35.0. About half of the teachers (52.6%) were first grade teachers while 26.3% taught 2<sup>nd</sup> grade and 21.1% taught 3<sup>rd</sup> grade. The average years of teaching experience was 8.79. About 52% of teachers had a bachelor's degree, while 47.4% had a master's degree.

Table 1. Teacher Characteristics: Frequencies and Means

<u>Age</u>		<u>Race</u>		<u>Gender</u>		1 <sup>st</sup>	<u>Grade</u>		3 <sup>rd</sup>	<u>Experience</u>		<u>Education</u>	
M	SD	AA	W	F	M		2 <sup>nd</sup>			M	SD	BA	MA
35.0	8.8	12	7	19	0	10	5	4		8.8	11.2	10	9

Table 2. Characteristics of the Sample: Means, Standard Deviations, and Frequencies

Variable	Entire Sample (n=43)	CL (n=13)	SHN (n=14)	Control (n=16)	F statistic	Significance Level
Child						
Age (years)						
M	7.19	7.15	7.21	7.19	F (2, 40) = .01	p = .99
SD	1.0	1.1	.8	1.2		
Gender						
male	28	7	10	11	F (2, 40) = .51	p = .61
female	15	6	4	5		
Grade						
1	28	10	6	12	F (2, 40) = 1.35	p = .27
2	8	1	5	2		
3	7	2	3	2		
ADHD meds						
yes	9	2	4	3	F (2, 40) = .37	p = .69
no	34	11	10	13		
WJ-III scores						
M	105.0	108.2	104.1	103.2	F (2, 40) = .25	p = .77
SD	19.4	22.0	17.6	19.7		
ADHD-RS-parent						
M	31.0	30.5	35.2	27.6	F (2, 39) = 1.35	p = .27
SD	12.6	11.3	9.1	15.9		
ADHD-RS-teacher						
M	40.7	40.3	39.9	41.9	F (2, 39) = .19	p = .83
SD	9.4	9.6	8.6	10.4		
% on-task						
M	38.4	40.0	35.9	39.4	F (2, 40) = 2.26	p = .77
SD	16.0	15.0	15.0	18.4		
% work complete						
M	74.7	70.3	80.1	73.2	F (2, 40) = .56	p = .58
SD	24.5	27.7	25.5	20.3		
% work correct						
M	55.6	48.7	56.8	61.3	F ( 2, 40) = .88	p = .42
SD	24.5	26.9	28.1	16.8		

(Table 2. continued)

Variable	Entire Sample (n=43)	CL (n=13)	SHN (n=14)	Control (n=16)	F statistic	Significance Level
<b>Family (Mother)</b>						
Marital status						
married	9	2	4	3	F (2, 40) = .33	p = .71
single	34	11	10	13		
Income						
Under \$3000	23	7	7	9	F (2, 40) = 1.07	p = .35
\$3000-14,999	14	5	3	6		
\$14,999-29,999	4	0	3	1		
\$30,000 and up	2	1	1	0		
Years of education						
M	11.1	11.7	11.0	10.8	F (2, 40) = .10	p = .90
SD	1.7	1.2	1.2	2.4		

## Observational Data

A repeated measures one-way ANOVA was run on observation time to determine if students' pretreatment on-task level at observation time 1, 2, and 3 could be collapsed into one variable. On-task levels at pretreatment observation time 1, 2, and 3 did not differ significantly from one another,  $F(2, 84) = 1.27$ , ns. As a result on-task level at observations 1, 2, and 3 was collapsed into one variable. A one-way ANOVA was conducted to determine if pretreatment on-task level differed by group. Analyses indicated that groups did not differ significantly in terms of pretreatment on-task level,  $F(2, 40) = .26$ , ns.

The same procedure was run to determine if the students' percentage of work complete and percentage of work correct at observation times 1, 2, and 3 could be collapsed into single variables. Results indicated that percentage of work complete and the percentage of work correct at observation 1, 2, and 3 did not differ significantly,  $F(2, 78) = .24$ , ns and  $F(2, 78) = .29$ , ns, respectively. As a result pretreatment percentages of work complete and pretreatment percentages of work correct were each collapsed into one variable. One-way ANOVAs were run to determine if pretreatment percent complete and pretreatment percent correct differed between groups. Results indicated that groups did not differ significantly in terms of percentage of work complete,  $F(2, 37) = .56$ , ns and percent of work correct,  $F(2, 37) = .88$ .

In order to discern if time of observation had a significant effect on on-task behavior during treatment, a repeated measures one-way ANOVA was run on the three observations taken at the end of the first three weeks of treatment and the three observations taken at the end of the second two weeks of treatment. Results of the analyses indicated that sphericity was violated,  $\chi(14) = .535$ . As a result the Greenhouse-Geisser correction was used. Observation time did not



have a significant effect on level of on-task behavior,  $F(4.13, 169.41) = 1.65$ , ns. Subsequently on-task levels for observations 4, 5, 6, 7, 8, and 9 were collapsed into one variable.

A split-plot ANOVA with treatment group as the between subjects variable and percentage of on-task behavior exhibited pretreatment and during treatment on-task behavior as the within subjects variable was run and found a significant main effect of treatment group on on-task behavior,  $F(2, 39) = 12.8$ ,  $p < .01$ . Observation time had a significant main effect on on-task behavior,  $F(1, 39) = 226.68$ ,  $p < .01$ . There was also a significant interaction between treatment group and observation time,  $F(2, 39) = 53.45$ ,  $p < .01$ . A follow-up Tukey HSD test showed that the Control group ( $M = 39.55$ ) was significantly different from both the School-Home Note Group ( $M = 61.21$ ) and the Classroom Rewards groups ( $M = 60.76$ ); however, the Classroom Rewards group was not significantly different from the School-Home Note group. Pairwise comparisons using the Bonferoni procedure showed the pretreatment on-task levels ( $M = 38.13$ ) differed significantly from during treatment on-task levels ( $M = 69.55$ ) across groups. In order to analyze the interaction of treatment group and time of observation a dependent t-test was run on each group using a Bonferoni correction which adjusted the alpha level to .017. Results of the tests showed a significant difference between on-task behavior pretreatment and during treatment for the School-Home Note group,  $t(13) = -14.99$ ,  $p < .017$ ; and the Classroom Rewards group  $t(12) = -8.79$ ,  $p < .017$ . There was no significant difference in pretreatment and during treatment on-task levels for the control group,  $t(14) = -.74$ , ns. In order to determine if on-task behavior was significantly different during treatment for all three groups, independent samples t-tests were run using a Bonferoni correction. For two of the three t-tests HOV was violated, therefore correctional formulae were used. Results indicated there was not a significant difference between the Classroom Rewards ( $M = 81.53$ ) and School-Home Note group ( $M =$

86.56),  $t(18.43) = 1.31$ , ns, however the control group ( $M = 40.56$ ) was significantly less on-task than both the School-Home Note Group ( $M = 86.56$ ),  $t(18.44) = 9.523$ ,  $p < .017$  and the Classroom Rewards group ( $M = 81.53$ ),  $t(26) = 7.13$ ,  $p < .017$ .

Table 3: Comparison of Outcomes by Treatment Group

	CL		SHN		CO	
	PreTx	Tx	PreTx	Tx	PreTx	Tx
<b>On-task Behavior*</b>						
M	39.97	81.54	35.86	86.56	38.56	40.56
SD	14.95	12.14	14.97	6.79	18.67	17.34
<b>Classwork Complete</b>						
M	70.33	93.56	80.10	94.36	73.20	69.27
SD	27.70	13.32	25.52	10.30	20.34	21.24
<b>Classwork Correct*</b>						
M	48.72	85.96	56.81	83.12	61.33	61.02
SD	26.89	16.99	28.06	15.50	16.88	24.95
<b>ADHD Rating Scale</b>						
<b>Teacher</b>						
M	40.31	26.77	39.31	28.77	42.14	40.43
SD	9.66	15.56	8.72	13.05	10.75	11.06
<b>ADHD Rating Scale</b>						
<b>Parent</b>						
M	30.91	29.18	36.25	25.17	28.27	31.91
SD	12.31	14.95	9.51	14.43	16.58	14.49

\* indicates significant interaction of treatment group and time of observation

### Classwork Completion

A repeated measures one-way ANOVA was run on the three observations taken at the end of the first three weeks of treatment and the three observations taken at the end of the second two weeks of treatment to determine if time of observation had a significant effect on percentage of classwork completed. Results showed that observation time did not have a significant effect on percentage of classwork completed,  $F(5, 195) = 1.32$ , ns. Subsequently percentage of work completed for observations 4, 5, 6, 7, 8, and 9 were collapsed into one variable.

A split-plot ANOVA with treatment group as the between subjects variable and percentage of classwork completed pretreatment and during treatment as the within subjects variable was run and found a significant main effect of treatment group on percentage of work completed,  $F(2, 37) = 4.255$ ,  $p < .05$ . A follow-up Tukey HSD test showed that the Control group ( $M = 71.23$ ) completed significantly less classwork than the School-Home Note Group ( $M = 87.23$ ). The Classroom Rewards group ( $M = 81.93$ ) did not differ significantly from either the School-Home Note group or the Control group in terms of classwork completed. Observation time had a significant main effect on percentage of work completed,  $F(1, 37) = 5.73$ ,  $p < .05$ . A Pairwise comparison using the Bonferoni procedure showed the percentage of work completed pretreatment ( $M = 74.54$ ) was significantly less than the percentage of work completed during treatment ( $M = 85.73$ ) across groups. The interaction between treatment group and percent of work completed approached significance,  $F(2, 37) = 2.86$ ,  $p = .07$ . The results of the interaction do not support hypothesis number three; however, analysis of the means supports the overall expected trend. That is, both the School-Home Note ( $M = 94.36$ ) and Classroom Rewards ( $M = 93.56$ ) groups on average completed more work than the Control group ( $M = 69.27$ ) at time two.

### Classwork Accuracy

A repeated measures one-way ANOVA was run on the three observations taken at the end of the first three weeks of treatment and the three observations taken at the end of the second two weeks of treatment to determine if the time of observation had a significant effect on accuracy of classwork. Results showed that observation time did not have a significant effect on accuracy of classwork,  $F(5, 195) = 1.64$ , ns. Subsequently accuracy of classwork completed for observations 4, 5, 6, 7, 8, and 9 were collapsed into one variable.

A split-plot ANOVA with treatment group as the between subjects variable and accuracy of classwork pretreatment and during treatment as the within subjects variable was run and found a significant main effect of observation time on accuracy of work completed,  $F(1, 37) = 20.97$ ,  $p < .01$ . Pairwise comparisons using the Bonferoni procedure showed the accuracy of work pretreatment ( $M = 55.62$ ) was significantly less than the accuracy of work completed during treatment ( $M = 76.70$ ) across groups. Treatment group did not have a significant main effect on accuracy of work completed,  $F(2, 37) = .969$ , ns. The interaction between treatment group and accuracy of work completed was significant,  $F(2, 37) = 5.74$ ,  $p < .01$ . In order to analyze the interaction of treatment group and time of observation a dependent t-test was run on each group using a Bonferoni correction which adjusted the adjusted to alpha level to .017. Results of the tests showed a significant difference between percentage correct pretreatment and during treatment for the School-Home Note group,  $t(13) = -3.16$ ,  $p < .017$ ; and the Classroom Rewards group  $t(12) = -4.54$ ,  $p < .017$ . That is, both treatment groups correctly completed significantly more work during treatment than before treatment. There was no significant difference in pretreatment and during treatment accuracy levels for the control group,  $t(12) = .04$ , ns. Independent samples t-tests were run to determine if there was a significant difference between

the accuracy levels between treatment groups during treatment and found that there was not a significant difference  $t(25) = .653$ , ns.

### ADHD Rating Scale

To determine if teacher's ratings on the ADHD Rating Scale improved from pretreatment to posttreatment, a split-plot ANOVA with treatment group as the between subjects variable and time as the within subjects variable was run and found a significant main effect of treatment group,  $F(2, 37) = 3.41$ ,  $p < .05$  and time,  $F(1, 37) = 12.13$ ; however the interaction was not significant,  $F(2, 37) = 2.11$ , ns. A follow-up Tukey HSD test revealed that the School-Home Note ( $M = 34.04$ ), Classroom Rewards ( $M = 33.54$ ), and Control groups ( $M = 41.29$ ) were not significantly different in terms of teacher ratings on the ADHD Rating Scale over time. The lack of significant group differences is most likely due to a great amount in the variance in the data. A test of Pairwise Comparisons using the Bonferoni procedure was run and showed that teacher rating scales decreased from pretreatment ( $M = 40.58$ ) to posttreatment ( $M = 31.98$ ) across groups.

A similar procedure was used to analyze the parent ADHD rating scales. The split-plot ANOVA showed that there was not a significant main effect of treatment group or time, and the interaction was not significant.

### Teacher Satisfaction

Mean total satisfaction scores were calculated for each group. A maximum of 40 points could be obtained. The average total satisfaction score for teachers who implemented the School-Home Note intervention ( $M = 32.67$ ) was greater than the average score for teachers who implemented the Classroom Rewards intervention ( $M = 29.63$ ). Four teachers implemented both the School-Home Note and Classroom Rewards treatments in their classroom. Of those four

teachers two preferred the School-Home Note and thought that it was more effective, while 2 preferred the Classroom Rewards and found it more effective. Two teachers thought the Classroom Rewards intervention was easier to implement while one teacher thought the School-Home Note intervention was easier and one teacher thought both were easy to implement. Several teachers provided anecdotal information regarding their satisfaction with the intervention. Teacher 2 reported that the Classroom rewards intervention really helped her to deal with the students' behavior and she really noticed a change. Two teachers believed that the classroom rewards treatment was superior to the School-Home Note treatment because it gives more immediate rewards; however, one of those teachers noted that the Classroom Rewards treatment was not effective at addressing her student's anger problems. Another teacher suggested that each behavior have a response cost component instead of ratings such as "yes," "so-so," and "no." She noted that this would be a more objective way to rate the child's behavior. One teacher reported that the School-Home Note was more effective, although she was surprised because she expected the more immediate rewards to be more motivating.

#### Parent Satisfaction

Parents provided anecdotal comments about their satisfaction with the treatment. Three parents noted that they thought the treatment was easy to implement except they found it difficult to have rewards on hand to give their child each night. One parent wanted to use the intervention with their other children, and three parents asked to continue the treatment after the study was over or during the following school year. One parent noted that their child was very proud to show the note to them each night. Finally, one parent reported that the intervention was helpful, but they did not think the rewards influenced the effectiveness of the treatment.

## DISCUSSION

The present study compared the efficacy of home based and classroom based rewards to reduce off-task behavior and increase classwork completion and accuracy in elementary school students with ADHD. All students in the treatment groups were evaluated by their teachers on a daily behavior report card. Teachers rated each child on four target behaviors during the morning work period and crossed off happy faces if the child exhibited off-task or disruptive behavior. Children were given rewards contingent on satisfactory classroom behavior as indicated by the note. However, the classroom rewards group received the reinforcement following the teacher feedback, while the children in the School-Home Note group took the note home to review with their parents and received reinforcement at the end of the school day. The study also explored whether the interventions might affect the parent and teacher's rating of the child's overall symptoms of ADHD. This was measured by having the parent and teacher rate the child on the ADHD Rating Scale prior to treatment and after treatment.

The sample was fairly homogenous as all participants were African-American, and most were in first grade with average academic skills. All met the diagnostic criteria for ADHD and displayed significant levels of off-task behavior prior to treatment. Most of the participants were not being prescribed any type of medication for ADHD. Over half of the children came from low SES households with an annual income of less than \$3,000. Most mothers reported their marital status as being single with an average of 11 years of education. As a result, caution should be used in generalizing these results to populations that are not similar to the one described. The groups did not differ significantly from each other on any of the demographic variables, nor did they differ on any of the dependent measures prior to treatment.

This study supported the efficacy of both classroom and home based interventions. As hypothesized, on-task behavior in both the classroom rewards and the school-home note group significantly increased from pretreatment levels. The control group did not significantly change during the treatment phase of the study, suggesting that the interventions had a significant effect on on-task behavior. However, contrary our hypotheses the classroom rewards intervention was not superior to the school-home note intervention. In fact, the school-home note group actually displayed a slightly higher mean level of on-task behavior than the classroom rewards group, suggesting that delayed reinforcement inherent in the school-home note intervention did not hinder the efficacy of the intervention. This is contrary to some of the literature that suggests that ADHD children are more responsive to smaller more immediate rewards than larger delayed rewards (Tripp & Aslop, 2001). It could be argued that the rewards given in the classroom also were delayed rewards since the child might not have received the opportunity to engage in the preferred activity until after lunch at least an hour after the good behavior occurred. On the other hand, the point system incorporated into the notes may have functioned as a token economy and bridged the delay between the behavior and the reinforcement, as Hupp and colleagues (2002) suggested in his study regarding the effects of delayed rewards on sportsman-like behavior. Additionally, there may be an added benefit to having the parents also monitor daily classroom behavior through the school-home note.

Similar arguments could be made for the efficacy of the interventions on the classwork completion and accuracy rates. Both the classroom rewards and the school-home note groups improved their overall mean of percentage of classwork completed from pretreatment to during treatment levels. However, the interaction of treatment group and time was only marginally significant ( $p = .07$ ). Analysis of the means (see table 3) showed that the treatment groups



improved, while the control group decreased slightly in level of completeness. These results may indicate that there was some other cause for the increase in productivity not controlled for by the present study. For example, students could have improved due to increased monitoring by the teacher. The fact that the interaction was not significant despite the appearance of the means may be due to large variance in the data and a lack of power due to small sample size, as well as the fact that the means at baseline were relatively high, leaving less opportunity for improvement. Thus, from these results it cannot be concluded that either the school-home note or classroom based rewards had a significant effect on productivity as was previously found in the literature, however analysis of the means do support the literature (Blechman et al., 1981a; Blechman et al., 1981b; Dougherty & Dougherty, 1977; Jurbergs, 2002; Kelley & McCain, 1995; Robinson et al., 1981).

On the other hand, a significant interaction between treatment group and time was found in analyses on classwork accuracy. Both the school-home note and classroom rewards groups significantly increased in accuracy of classwork from pretreatment to during treatment levels. Whereas the control group remained stable in their percentage of correct items (see table 3). The classroom rewards group actually had a slightly higher average accuracy rating, however the difference was not significant. This finding supports research suggesting that classroom interventions and school-home notes improve academic accuracy (Carlson et al., 2000; Jurbergs, 2002; Kelley & McCain, 1995).

Analyses of the teacher ADHD rating scale total symptom scores (TSS) did not reveal a significant interaction of time and treatment group. However, there was a significant difference between treatment groups and there was a significant decrease in scores across groups over time. The overall trend of the means was in the expected direction with both treatment groups

decreasing in their TSSs and the control group remaining about the same, although also decreasing slightly. With more power, it is expected that a significant interaction would have been realized. Additionally, the treatment was only administered during the morning work period. It is likely that without the treatment in place in the afternoon, the student may exhibit more off-task and disruptive behavior, thus influencing the teacher's overall opinion of the student. Also, the length of the current study may not have been long enough to change teachers' perceptions which had developed over several months prior to the treatment. It is also possible that the expected results were not obtained because the ADHD rating scale may not have been a sensitive measure of the changes that occurred in the teachers' perceptions. Conclusions that can be drawn from the teacher ADHD rating scales are limited due to the fact that the teachers were not blind to the purpose of the study. Analyses of parent ADHD rating scale TSSs did not reveal any significant differences in treatment group or time. As a result the improvements in behavior realized in the classroom may not have generalized to the home environment. Also, parents were not blind to which intervention the students were receiving which may have influenced their ratings. Examination of the means showed that the school-home note group decreased about 11 points while the classroom rewards group decreased by about 2 points, and the control group increased almost 4 points. Increased communication from the school to the home could have resulted in the parents viewing their children more favorably resulting in a relatively larger decrease in TSSs than observed in other groups.

Although no conclusions can be drawn from the teacher satisfaction data, it appears that teachers found the classroom reward and school-home note to be both acceptable and effective. However, the mean satisfaction rating of teachers in the School-Home Note group was slightly higher than ratings of the Classroom rewards group. Again, we are not able to say whether or

not this difference was significant. Four teachers implemented both treatments. Thus, teachers were split over which treatment was preferable, more effective, and easier to implement, except one teacher thought they were equally easy to implement. Anecdotally and consistent with the literature, both treatments appear to be socially valid ways of dealing with behavior problems in children with ADHD (Pisecco et al., 2001). Several teachers touted the effectiveness of both treatments at helping deal with the child's behavior problems. Some teachers reported that they were surprised that the school-home note seemed to work as well as the classroom rewards, as they expected the immediacy of the rewards in the classroom to be a more potent reinforcer than the rewards given at home. Several teachers reported that they planned to continue using the school-home note after the conclusion of the study.

Parents also commented anecdotally on their satisfaction with the school-home note procedure. Consistent with previous research, the school-home note procedure appeared to be socially valid and an acceptable way to deal with child behavior problems (Kelley & McCain, 1995; Jurbergs, 2002, Pisecco, Huzinec, & Curtis). Additionally, considering the high degree of treatment integrity achieved with parents in the school-home note group, it is intuitive that they must have liked the treatment and found it acceptable.

The lack of significant differences between the school-home note and classroom based rewards, may indicate the appropriateness of an intervention is dependent on individual characteristics. For example, some children may be more responsive to more immediate rewards, while others may be more responsive to parent attention. An assessment of each child's classroom and family-life should be conducted to identify which treatment will be most effective. Factors that should be considered include parent and teacher characteristics such as

perceived acceptability of treatment, willingness to comply, available resources, and ability to follow through.

It is important to note that three of the parents in the school-home note reported that it was hard for them to always have rewards on hand at home. This is probably a typical problem experienced by several low SES families similar to those involved in the current investigation. As a result it may be important to consider a family's ability to provide daily rewards when implementing a School-Home Note procedure. Families could be instructed to use preferred activities as reinforcement in lieu of tangible reinforcement which can be costly. Another consideration when using the school-home note with impoverished families is that the parents tend to be less educated and less likely to be involved in the education of their children (Hoover-Dempsey, Bassler, & Brissie, 1992). The school-home note is a fairly simple procedure; however, in situations where there is a great deal of family instability and lack of education, a classroom based procedure may be more appropriate.

In contrast to the literature describing low-income parents as being less likely to be involved in their child's education, the mothers in the present study all displayed a high level of treatment integrity and follow through. It should be noted that parents self-selected into the study by taking the initiative to contact the researchers. These parents may be more likely to comply with treatment than parents who received the flyer and did not call. As a result, the high rates of parent treatment integrity could be an artifact of parents who are likely to adhere to treatment self-selected into the study.

Teacher characteristics also must be considered when developing classroom behavior management plans. As seen in this study a teacher must be willing to complete the school-home note and provide consistent and accurate feedback daily. It would also be important to consider

the teacher's opinions about singling one child out for rewards in the classroom. Many teachers may consider this unfair to other children and thus they would elect to use a procedure such as the school-home note where rewards are given at home.

Additionally, behavior management systems should be tailored to individual children. As stated earlier some students may be more responsive to immediate rewards or larger delayed rewards than others. In the current study the researchers did not exclude children with comorbid disorders. As a result children who may be more resistant to teacher feedback and rewards could have confounded the results of the study. Functional assessment may be indicated for determining the most appropriate intervention for the child. Potential child variables to consider include responsiveness to teacher feedback and praise, reprimands, immediate versus delayed rewards, and parental feedback and praise.

The present study is the first to compare the efficacy of a classroom based intervention to a school-home note procedure in a low-income African-American population. Previous research has evaluated the use of the school-home note in the treatment of middle class, Caucasian, children with ADHD (Allyon, Garber, & Pisor, 1975; Kelley & McCain, 1995; McCain & Kelley, 1994). The results of the present study indicate that both home based and classroom based contingency interventions can be effective treatments for impoverished youth whose families have few disposable resources. Both treatments appear to be equally effective, thus as previously mentioned teacher, parent, and child factors are the determining factors when choosing between classroom and home based reinforcement.

A number of areas of future research are indicated by the current study. Future research should attempt to control for the effect of teacher feedback. It would be important to determine if the increase in positive behavior is the result of increased feedback, increased communication

with the parents, or contingent reinforcement. Additionally, it would be interesting to examine the validity of the teacher's ratings on the school-home notes to objective observations of the children. One teacher suggested that a response cost component be used to assess each individual behavior. That way the child would have a quantitative summary of how many times they were off-task or out of seat during the work period. This rating system may be a more objective way to rate the student's behavior rather than a "yes," "so-so," "no" which are very susceptible to changes in the teacher's mood or previously held notions about the child. Finally, research concerning the combination of stimulant medication and contingency management in the classroom and at home for children with ADHD is also an important area of future research.

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## APPENDIX: CONSENT FORMS

### PARENT CONSENT FORM

**1. Study Title:** A Relative Comparison of Teacher Feedback, School-Home Notes, and School Based Rewards In Minority Elementary School Students with Attention-Deficit/Hyperactivity Disorder

**2. Performance Sites:** Children and their parents will be recruited on a voluntary basis from East Baton Rouge Parish schools.

**3. Names and Telephone Numbers of Investigators:** If you have questions concerning this form or the study, please contact Mary Lou Kelley, Ph.D., Niki Jurbergs, and Jenny Palcic at (225)-358-1321 on Monday through Friday, 8:00 a.m. to 4:30 p.m, or the 24-Hour Crisis Hotline at (225)-924-3900 24 hours a day.

**4. Purpose of the Study:** The purpose of this study is to evaluate two classroom interventions for elementary school students with ADHD. We will look at the efficacy of home and school based rewards procedure. We want to know which one would work better to help your child pay attention in class and complete more of his or her classwork. Your child's behavior in the classroom and his or her classwork will be studied.

**5. Subject Inclusion:** Children participating in this study will be in grades one through three, attend an East Baton Rouge Parish school, possess average academic abilities, display significant disruptive or inattentive behavior in the classroom as reported by the teacher, and will have a diagnosis of ADHD.

**6. Number of Subjects:** 60

**7. Study Procedures:** First, you will be interviewed and your child will be evaluated for ADHD. The evaluation will consist of a teacher interview, a classroom observation, and questionnaires. You will be asked to fill out two questionnaires asking about your child's behavior at home and at school. Your child's teacher will fill out similar questionnaires. If your child meets criteria for ADHD, you will be invited to continue participating in the study.

Over a period of two months, 1-2 days per week, the investigator and several research assistants will grade your child's classwork for completion and accuracy as well as observe your child and your child's teacher in the classroom. Your child will be randomly assigned to one of four groups: control group, teacher feedback group, classroom note group, or school-home note group.

In the control group, your child will simply be observed and no treatment will take place. You will not be asked to do anything. In the teacher feedback group, your child's teacher will rate his or her behavior in the morning, and give verbal feedback based on those ratings. You will not be asked to do anything. In the classroom note group, your child's teacher will rate his or her behavior in the morning, give verbal feedback based on those ratings, and reward your child based on his or her behavior. The investigator will work with the teacher to establish what constitutes a "good note" and what type of rewards the teacher will give to your child. You will not be asked to do anything. In the school-home note group, your child's teacher will rate his or her behavior in the morning. The note will be sent home for you to provide rewards based on your child's good behavior for the day. The investigator will work with you to establish what is a "good note" and what sort of rewards your child should be able to earn. You will be asked to review your child's note daily, provide the specified reward, sign the note, and send it back to school.

**8. Benefits:** Possible benefits of participating in this research project include increases in your child's classwork completion and an improvement in his/her classroom behavior. Not only may your child personally benefit from participation, the results of our study will add to the literature on treating children with ADHD and will benefit children in the future.

**9. Risks/Discomforts:** It is possible that your child will not appreciate the interventions being used in this study. He or she may be the only child in the classroom participating in the study and this may make him or her feel different from the rest of the children in the class. The researchers involved in this study are mandatory reporters of any child abuse or neglect. If child abuse or neglect is suspected, it will be reported to the Office of Community Services (OCS).

**10. Right To Refuse:** Participation in this study is voluntary, and your child will become part of the study only if you and your child both agree to participate. You or your child may change your mind and withdraw from the study at any time without penalty or loss of any benefit to which you may otherwise be entitled.

**11. Privacy:** The information gathered on you and your child will be kept confidential. Neither of your names will appear on any of the questionnaires or any other information. Your child will be identified by a code rather than a name. Any records with your name or your child's name will be maintained in a locked file cabinet in the home of one of the researchers of this study, Jenny Palcic. Subject identity will be kept confidential unless release is required by law.

**12. Financial Information:** There is no cost for participation in the study, nor is there any compensation to the subjects for participation.

**13. Alternatives:** If you and your child decide not to participate in this study or decide to withdraw at any time, it is possible that your child may benefit from other treatment for ADHD. You should consult a school guidance counselor, child psychologist, or pediatrician in order to learn more about these treatments.

**14. Signatures:**

"This study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Matthews, Chairman, LSU Institutional Review Board, (225) 578-8692. I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a signed copy of this consent form."

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Signature of Parent/Guardian

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Date

"The study subject has indicated to me that he/she is unable to read. I certify that I have read this consent form to the subject and explained that by completing the signature line above the subject has agreed to participate."

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Signature of Reader

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Date

## CHILD ASSENT FORM

I, \_\_\_\_\_, agree to be in study to find ways to help children act better in school. A researcher will watch me in class on some days and will grade my classwork. My teacher may give me notes that tell me how I acted in class. Either my teacher will tell me how I did each day, and either give me rewards or not; or I will bring the note home and my mom or dad will look at the note, and then give me a reward. If the people running the study think that someone is hurting me, they will tell someone about it. I can decide to stop being in this study at any time without getting in trouble.

_____ Child's Name and Age	_____ Child's Signature	_____ Date
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The study subject is a child and I certify that I am his/her legal guardian.

_____ Legal Guardian's Name	_____ Legal Guardian's Signature	_____ Date
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## VITA

Jennette L. Palcic is a doctoral student in clinical psychology at Louisiana State University, and is specializing in pediatric psychology. She graduated *Summa Cum Laude* from Tulane University with a Bachelor of Arts in psychology in May 2003. She will receive her Master of Arts in psychology in August of 2005. Her current research interests include childhood obesity, and externalizing disorders.